

➤ Status of Revercomb Evaluation/Validation Activities

- Noise characterization using Earth scene data (7/3, 8/1 Net-Meetings)
- Cloud flag using AIRS and MODIS data (7/3, 8/1, 8/15 Net-Meetings)
- Broadband radiance comparisons with GOES and MODIS
(7/3, 8/1, 8/15 Net-Meetings)
- Obs-Calcs using PREPQC and ARM site profiles (7/3 Net-Meeting)
- ARM site atmospheric state best estimate
- Upcoming aircraft under-flight and ground based LST/ ϵ validation opportunities

➤ EPO (and validation) opportunity via GLOBE sun-photometers

➤ Dome Concordia Validation Project Status (PI: V. Walden)



Dave Tobin, CIMSS/SSEC/UW -Madison
AIRS Science Team Meeting
Camp Springs, MD 18-20 September 2002



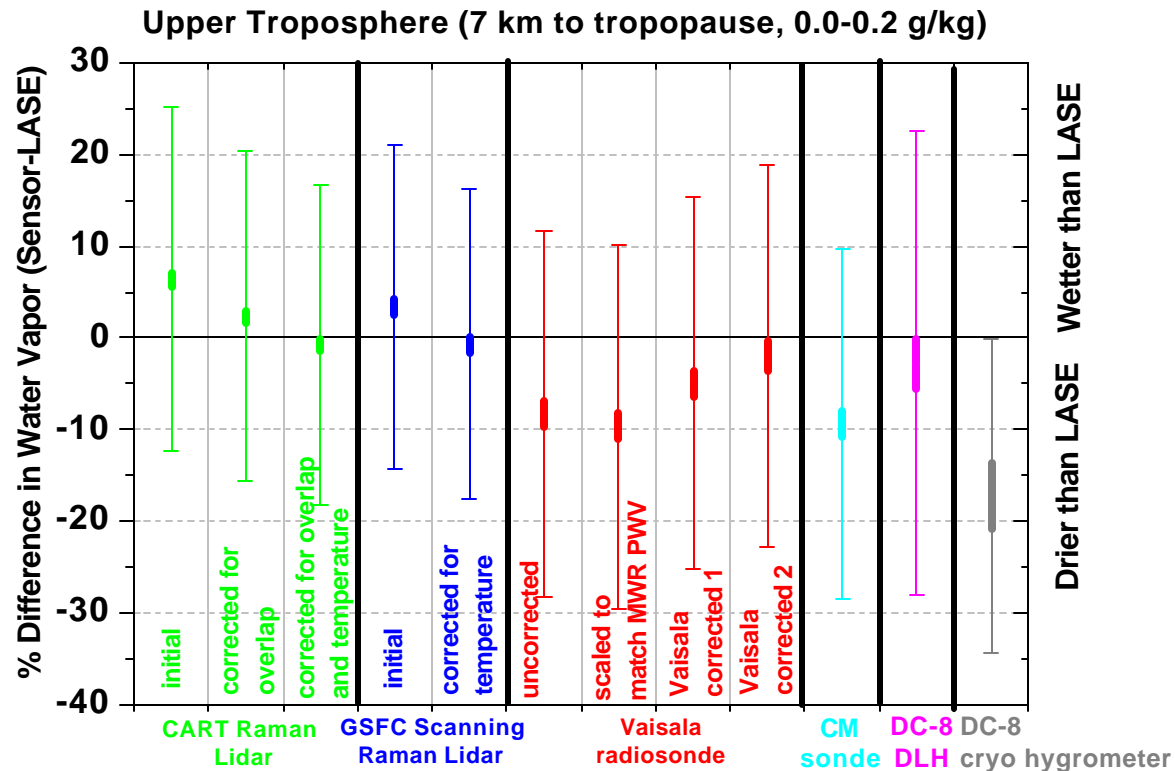
ARM Site Atmospheric State Best Estimate



- Now using JPL matchup files to initiate algorithm
- Algorithm is initiated for each *Match_Fixed_ValSites* matchup file found. Uses closest (in space) ARM site matchup per overpass found in matchup file.
- Overpass dedicated sonde launches began in last week of July.
- Some new fields in output file: lwpSite, granule_number, matchupFile, matchup_index
- Southern Great Plains
 - “Full” algorithm (v1.0) in place. Well, almost - currently working on uncertainty estimates.
 - Files available from `weather:/dom/files/ops/correl/point/YYYY/MM/ded_site/armbe*.cdf`
 - Auxillary images and plots available from <http://airs3.ssec.wisc.edu/~airs/aaasbe/>
- North Slope of Alaska and Tropical Western Pacific
 - Currently using a simplified algorithm. Does “plain” interpolation in time between sondes to overpass time and MWR pwv scaling.
 - NSA sonde data ingest being worked
 - TWP sonde data accessible 1-2 months after collection
- Upper trop sonde water vapor corrections
 - to be implemented, based on recent Wang et. al JTECH paper

ARM Water Vapor Research. Updates

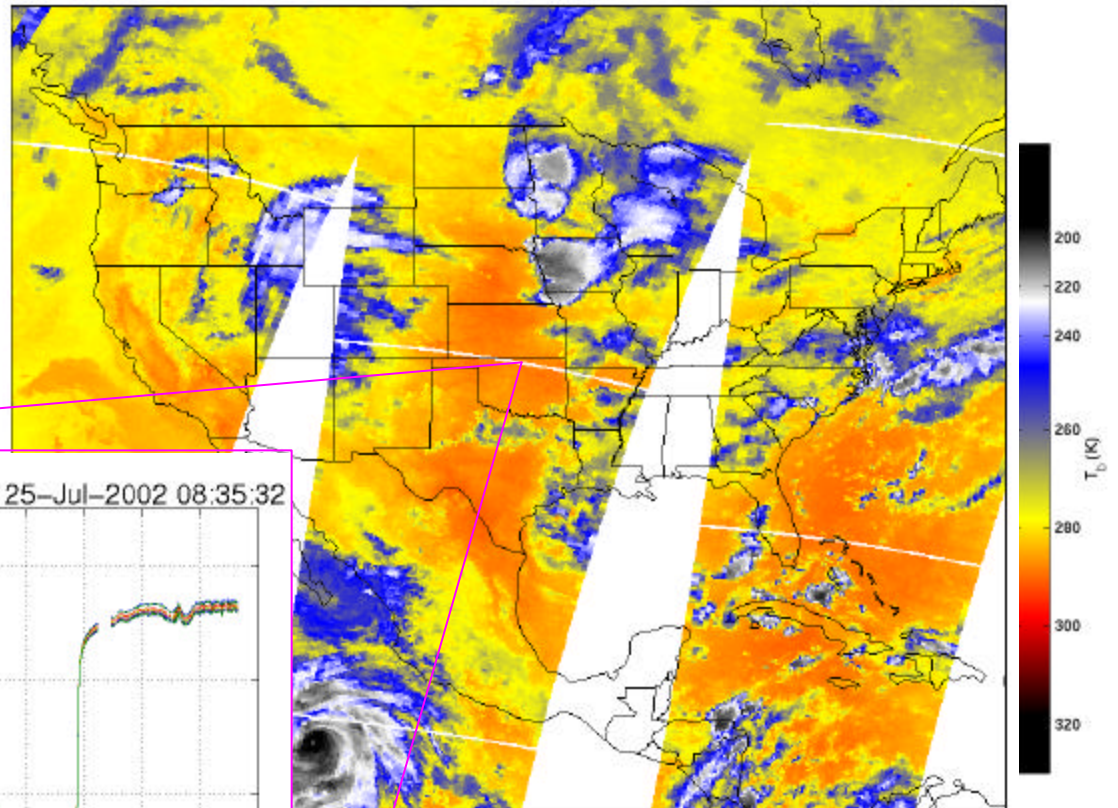
- **Assessment of Upper Troposphere Water Vapor Measurements during AFWEX using LASE.** c/o R. Ferrare, Water Vapor Breakout Meeting, ARM STM April 2002.



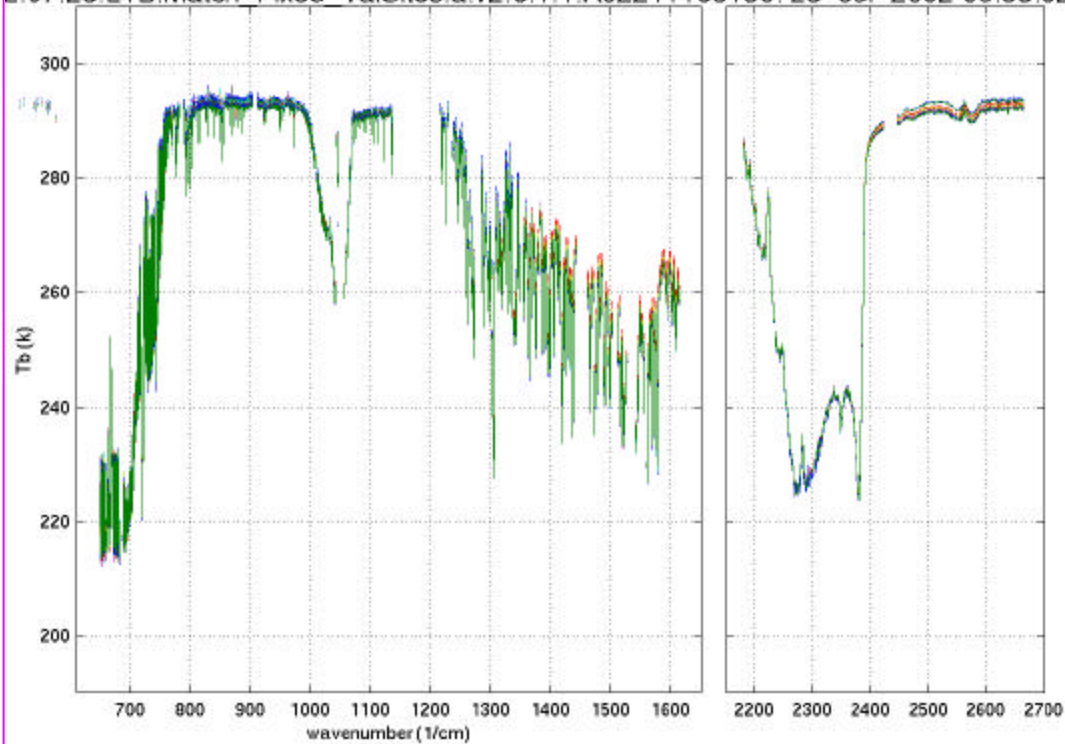
- **PWV derived from 23.8 GHz MWR at SGP site accurate to ~1 percent.** PWV values from standard ARM processing of MWR are ~1 percent too moist. Based on 22 GHz line analysis c/o S. A. Clough using a multi-frequency MWR-profiler.

25-Jul-2002 08:35 ARM SGP Overpass

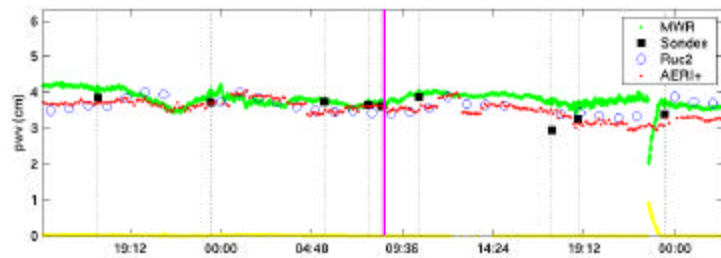
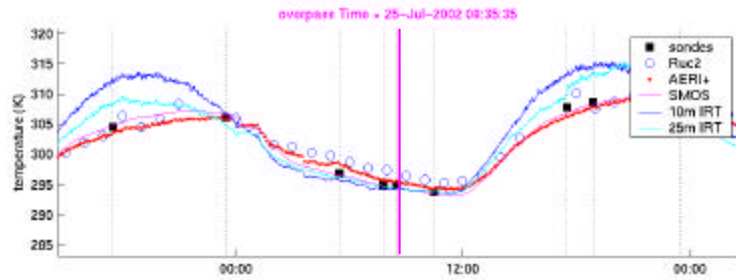
AIRS.2002.07.25.*.L1B.AIRS_BrSub.v2.6.1.1* descending "LW_Window"



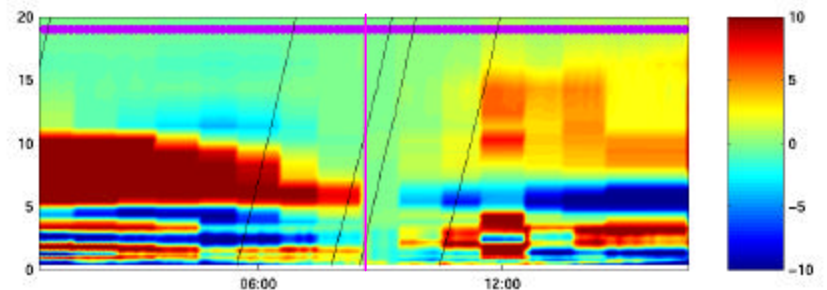
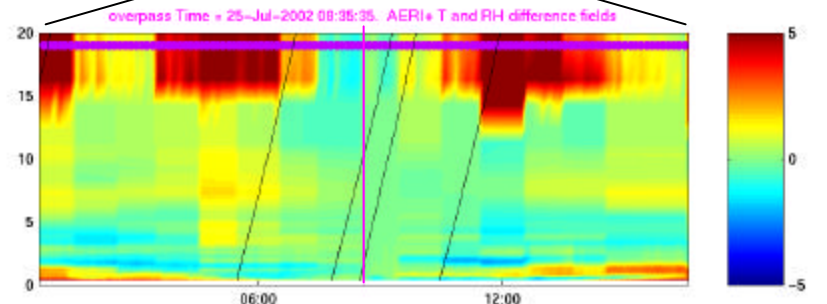
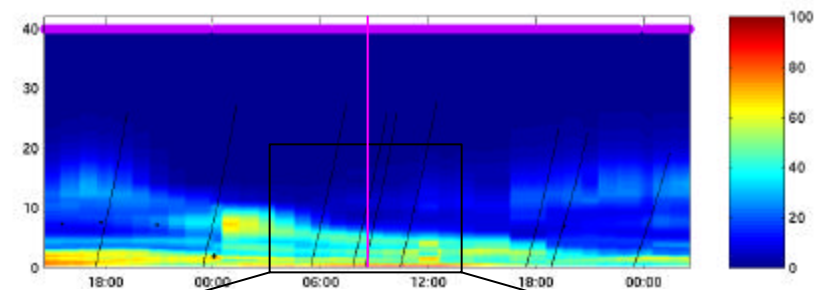
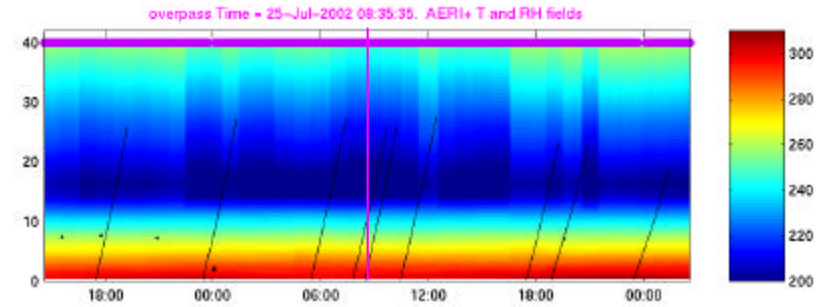
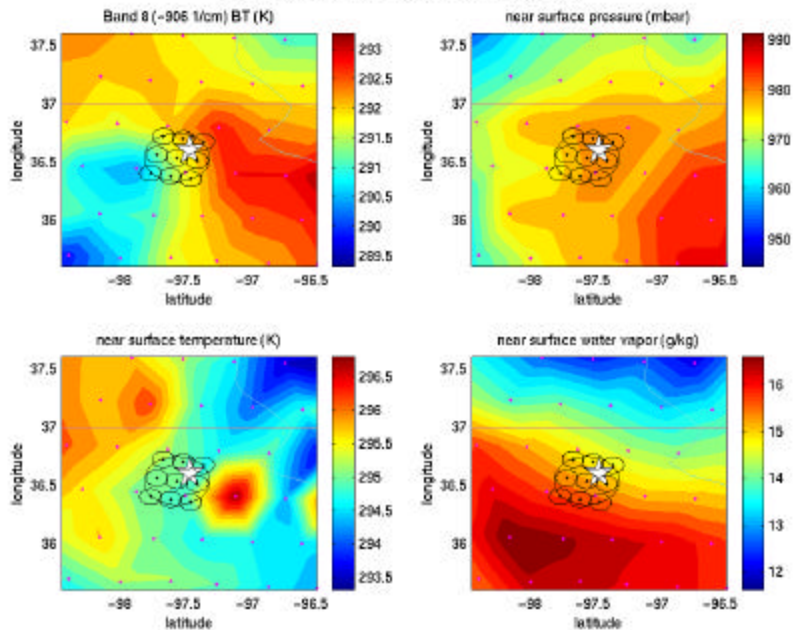
2.07.25.L1B.Match_Fixed_ValSites a v2.6.1.1.A02211163130: 25-Jul-2002 08:35:32



25-Jul-2002 08:35 ARM SGP Overpass



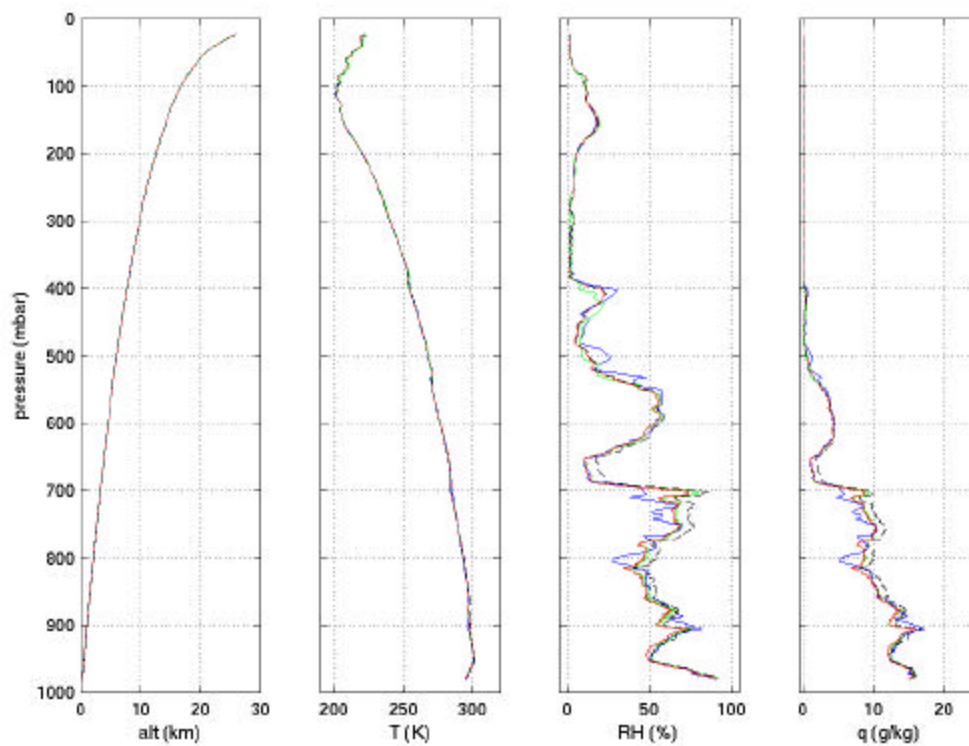
GOES fields at 25-Jul-2002 08:59:26



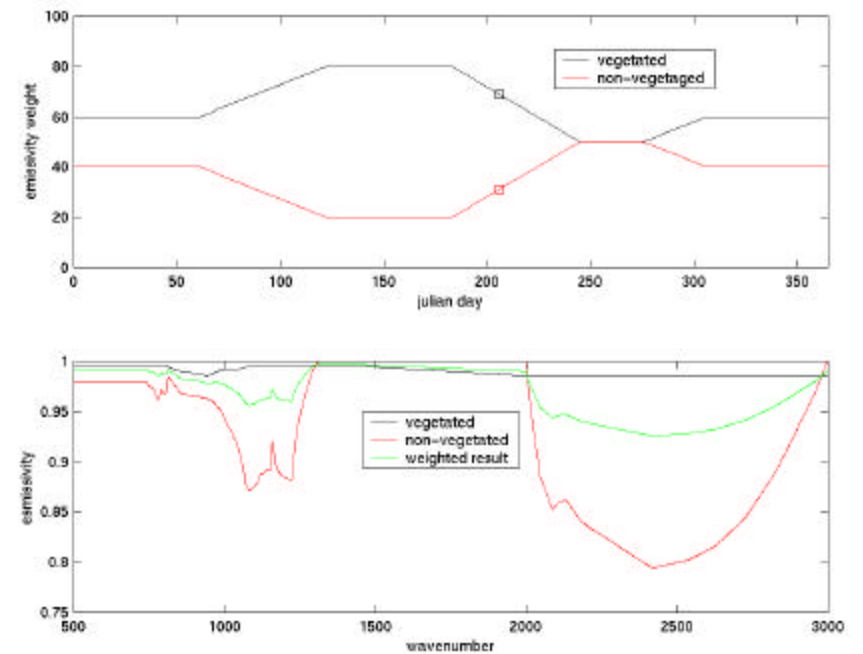
25-Jul-2002 08:35 ARM SGP Overpass

Best estimate profiles

blue: sonde1; green: sonde2; red: site; black: amsu



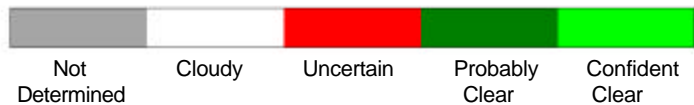
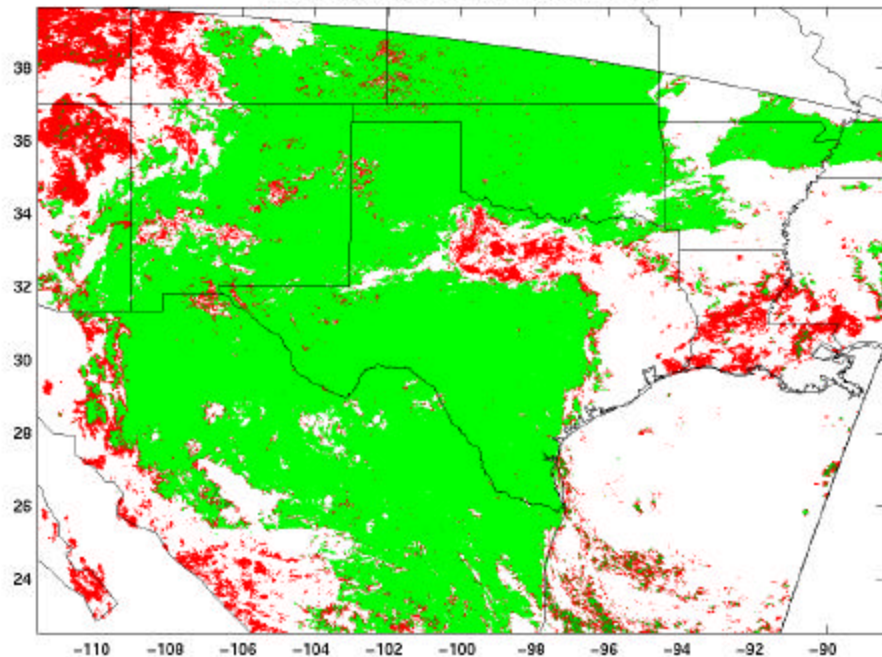
SGP emissivity estimate



25-Jul-2002 08:35 ARM SGP Overpass. Is it clear ?

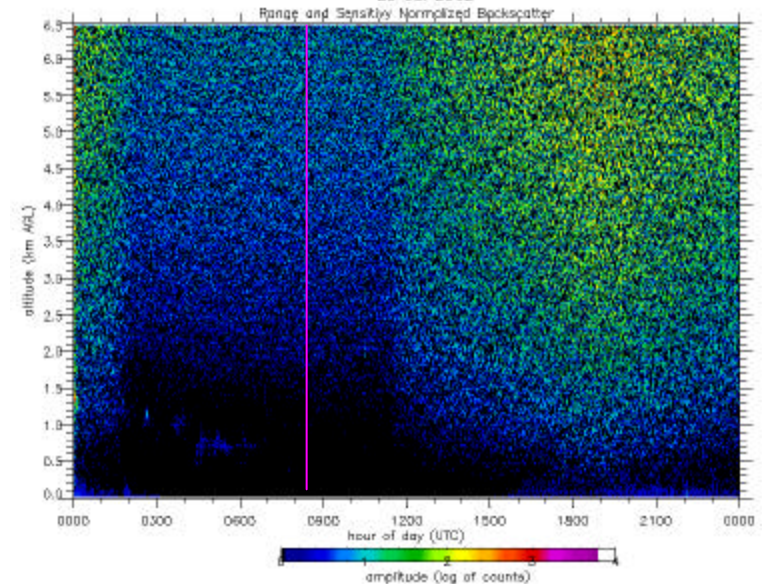
MODIS cloud mask

MYD35_L2.A2002206.0835.003.2002207094458.hdf

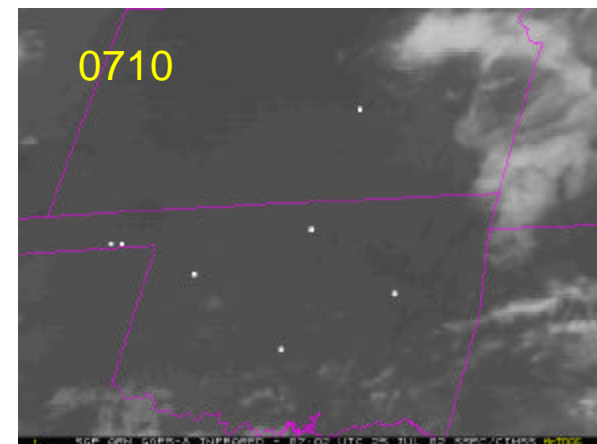


Vaisala Ceiliometer

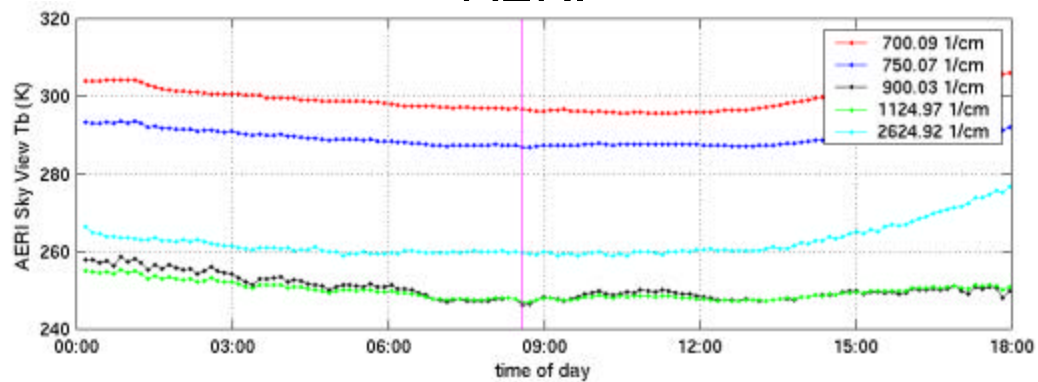
VCEIL_C1
25 Jul 2002



GOES Sounder 12 μ m

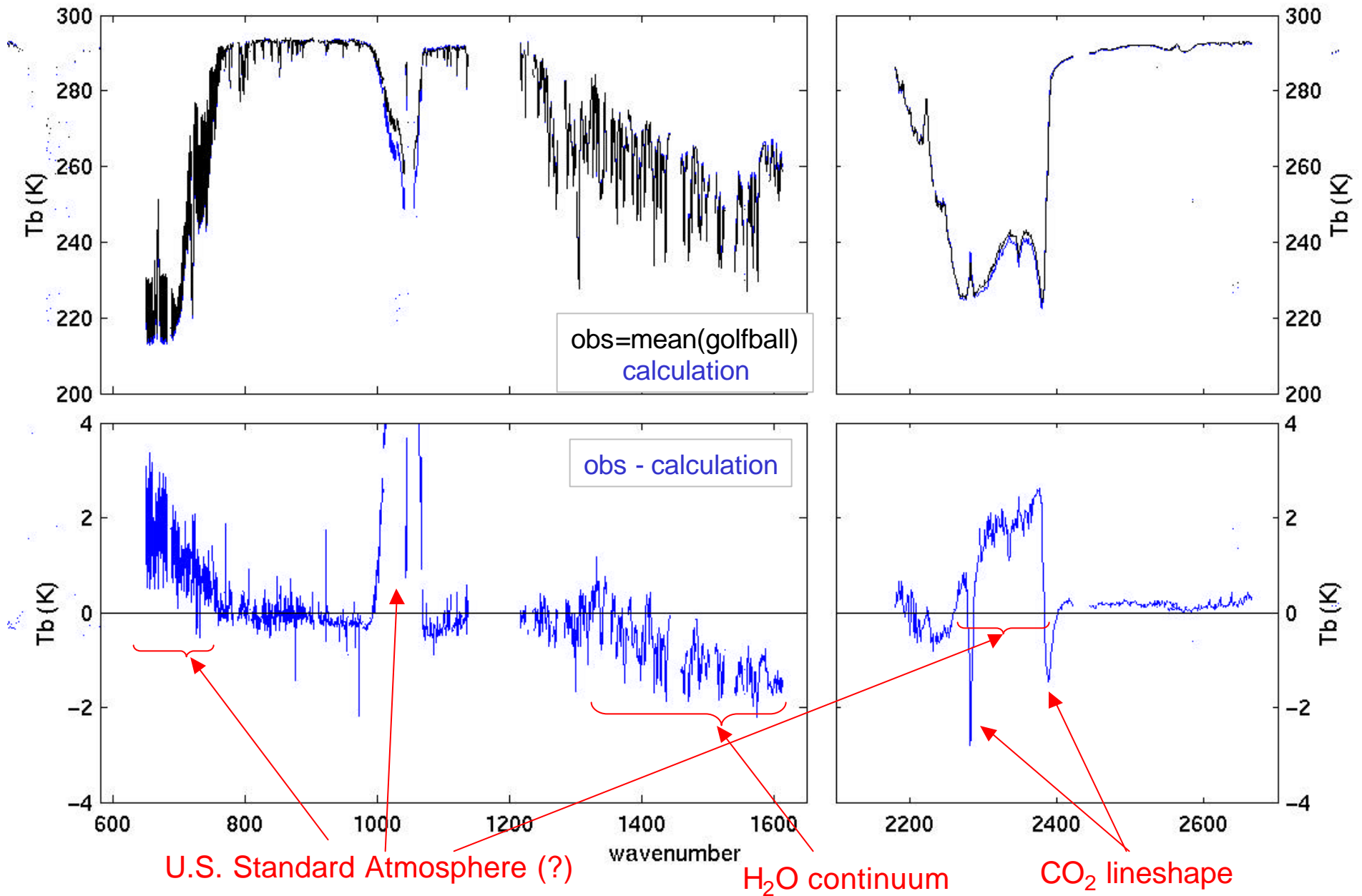


AERI



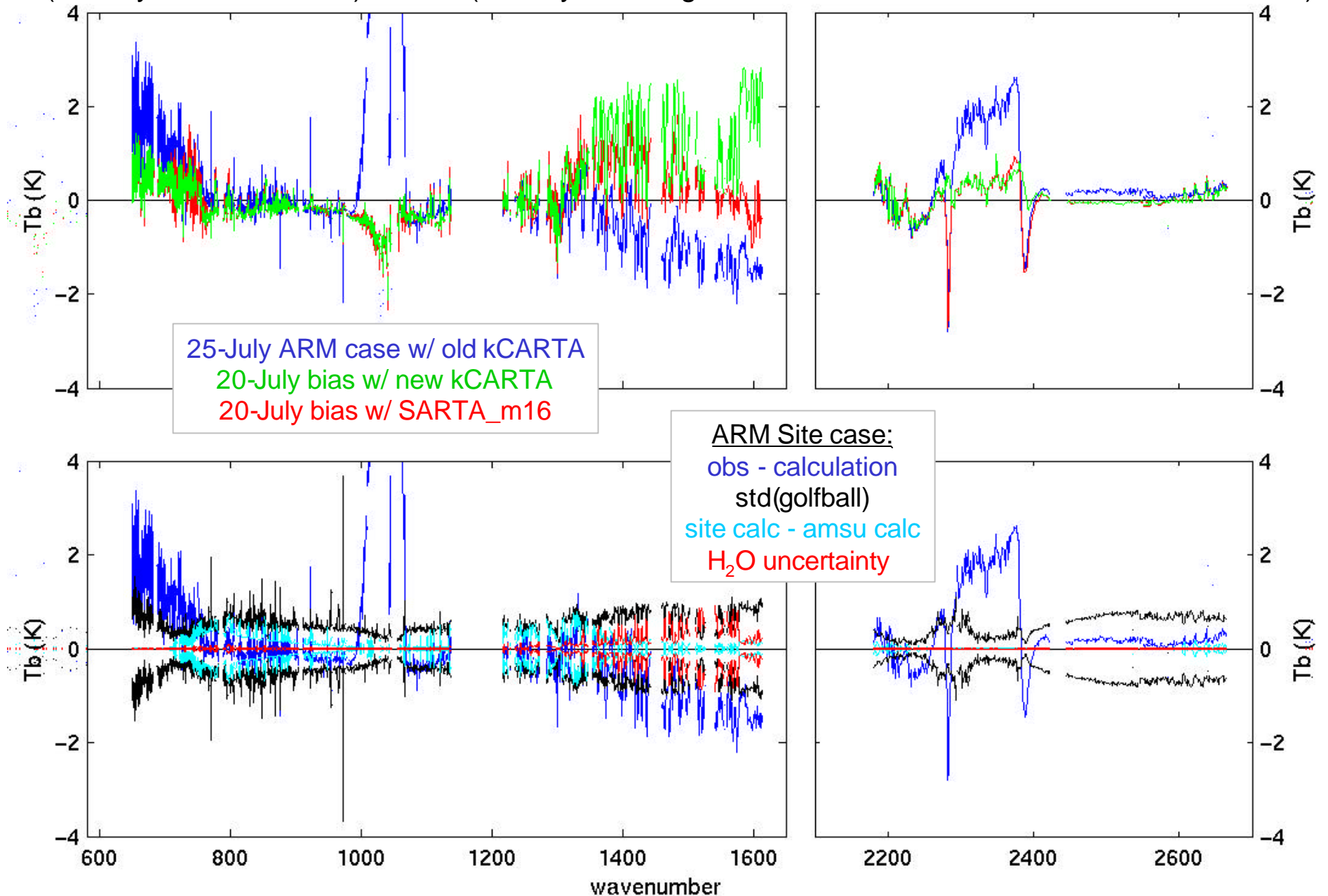
25-Jul-2002 08:35 ARM SGP Overpass

This calculation uses "old" kCARTA and AMSU-fov best estimate T, q, and LST/ ϵ + U.S. Standard atmos



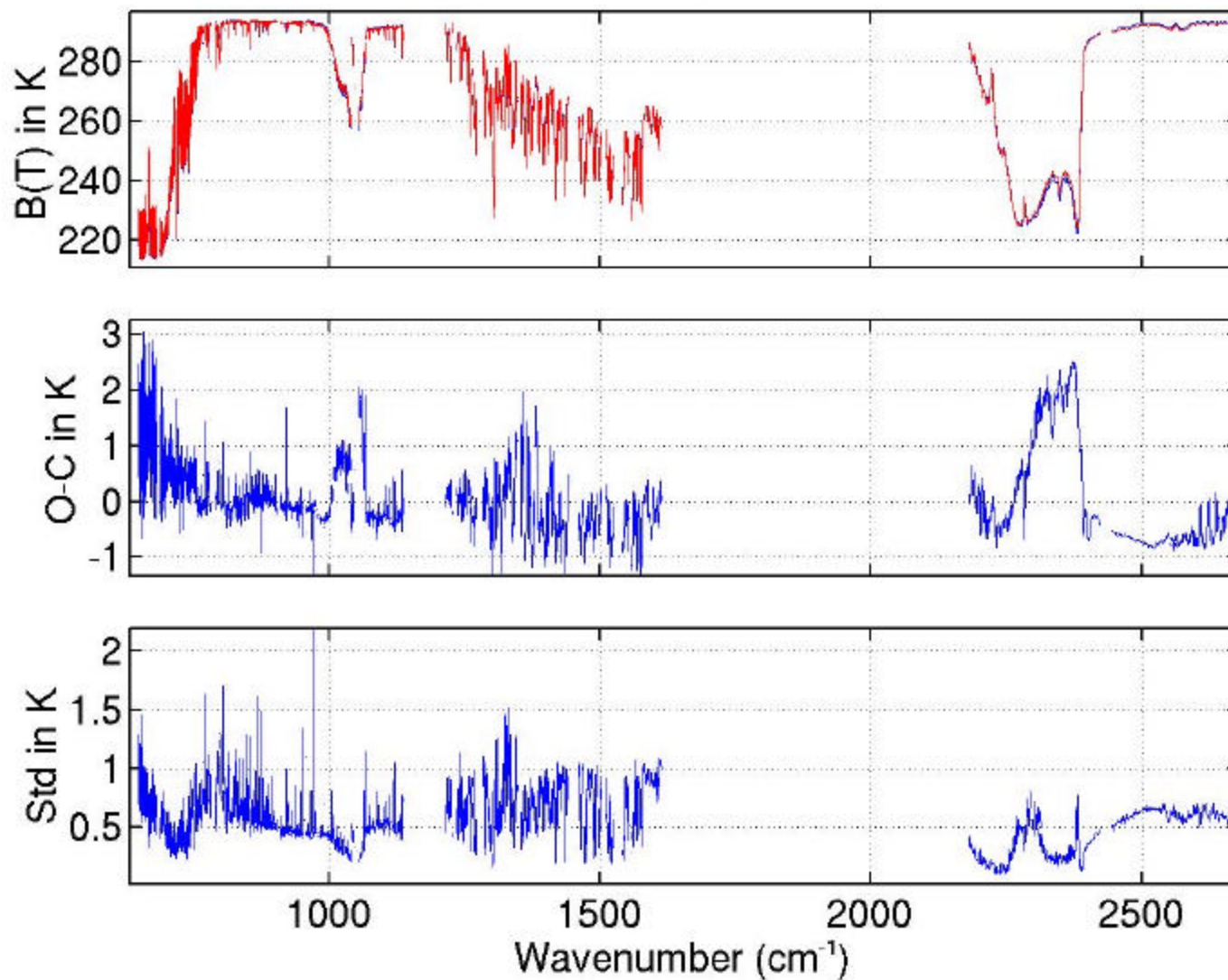
25-Jul-2002 08:35 ARM SGP Overpass

(25-July ARM site case) versus (20-July clear/night/ocean ECMWF-based cases ala Strow et al)



25-Jul-2002 08:35 ARM SGP Overpass

Obs-Calcs with “new” kCARTA using ARM best estimate
supplemented with ECMWF (ala Strow et al)



upcoming aircraft under-flight opportunities

ARM “Grand Tour”, SGP CART field program

- ARM objectives with Aqua underflights of opportunity
- Scanning-HIS on Proteus
- Based out of Ponca City, OK with flights over SGP ARM site
- Science flights from November 3rd to 16th

Texas 2002

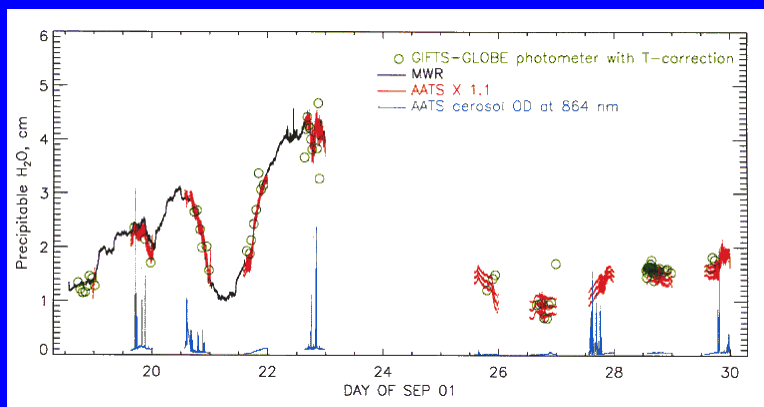
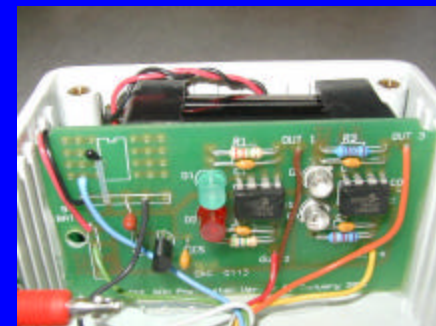
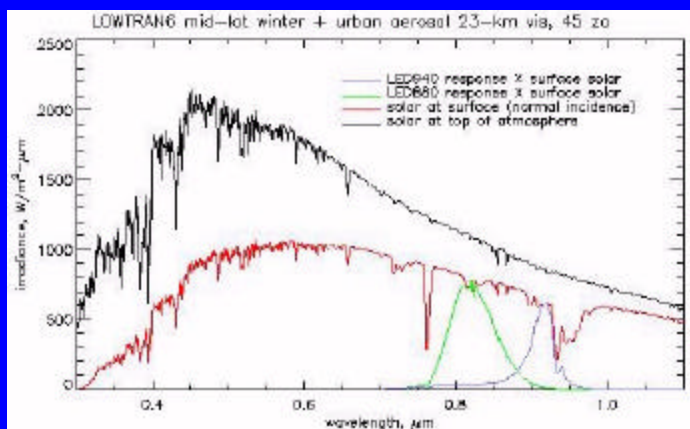
- Dedicated Aqua MODIS Level 1B validation mission. Chris Moeller (CIMSS/SSEC/UW) is the mission scientist.
- Scanning-HIS, NAST-I, MAS, and CPL on NASA ER-2
- Ground based AERI-bago observations for LST/ ϵ validation
- Based out of San Antonio with flights over the Gulf of Mexico and SGP ARM site
- Science flights from November 20th to December 12th



Sun/Haze Water Vapor Photometer

http://tellus.ssec.wisc.edu/outreach/gifts/sp_measure/sp_meas_home.htm

An Education and Outreach Activity for validating Total Column Water Vapor from space based measurements with surface observations from schools around the world in collaboration with GLOBE Program

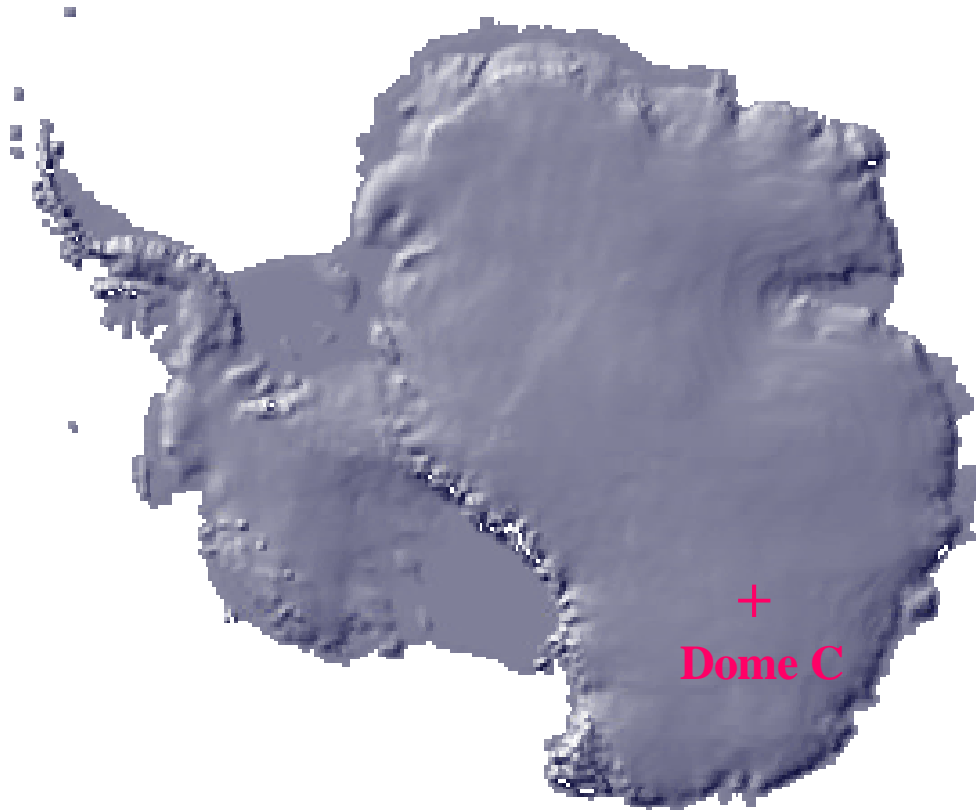


For more information,
Contact:
sanjayL@ssec.wisc.edu



UPDATE:

Validation of AIRS over the Antarctic Plateau:
Low radiance, low humidity, and thin clouds



Von P. Walden
University of Idaho

Dave Tobin
University of Wisconsin-Madison

Bob Stone
NOAA-CMDL

Scheduling of Experiment

- 2 January 2003 Field team arrives at Dome C
 - 2 – 9 January 2003 Set up for validation experiment
 - 9 – 31 January 2003 Acquire validation data
 - 4 February 2003 Field team leaves Dome C
-
- Dome C validation experiment is scheduled to begin around 9 January 2003, which is currently Launch + 251 (Launch + 8 months).

Validation Instruments

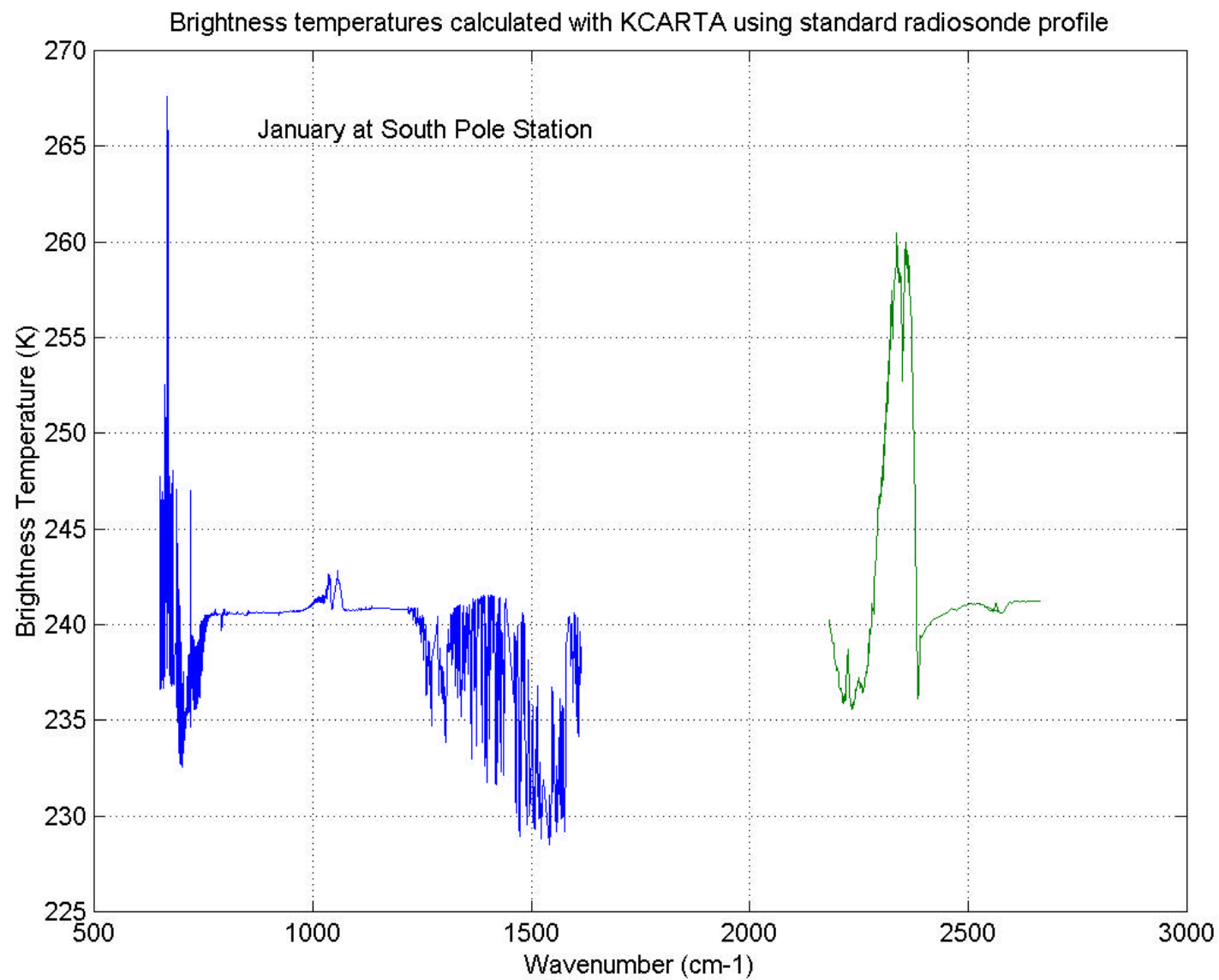
- **PAERI – Polar Atmospheric Emitted Radiance Interferometer**
(Von P. Walden, University of Idaho)
- **IRT - Infrared Radiometric Thermometer**
(Bob Stone, NOAA-CMDL)
- **Atmospheric Sounding System – in collaboration with French Astrophysics group**
(Eric Fossat, U. Nice)



AIRS TOA simulations using kCARTA

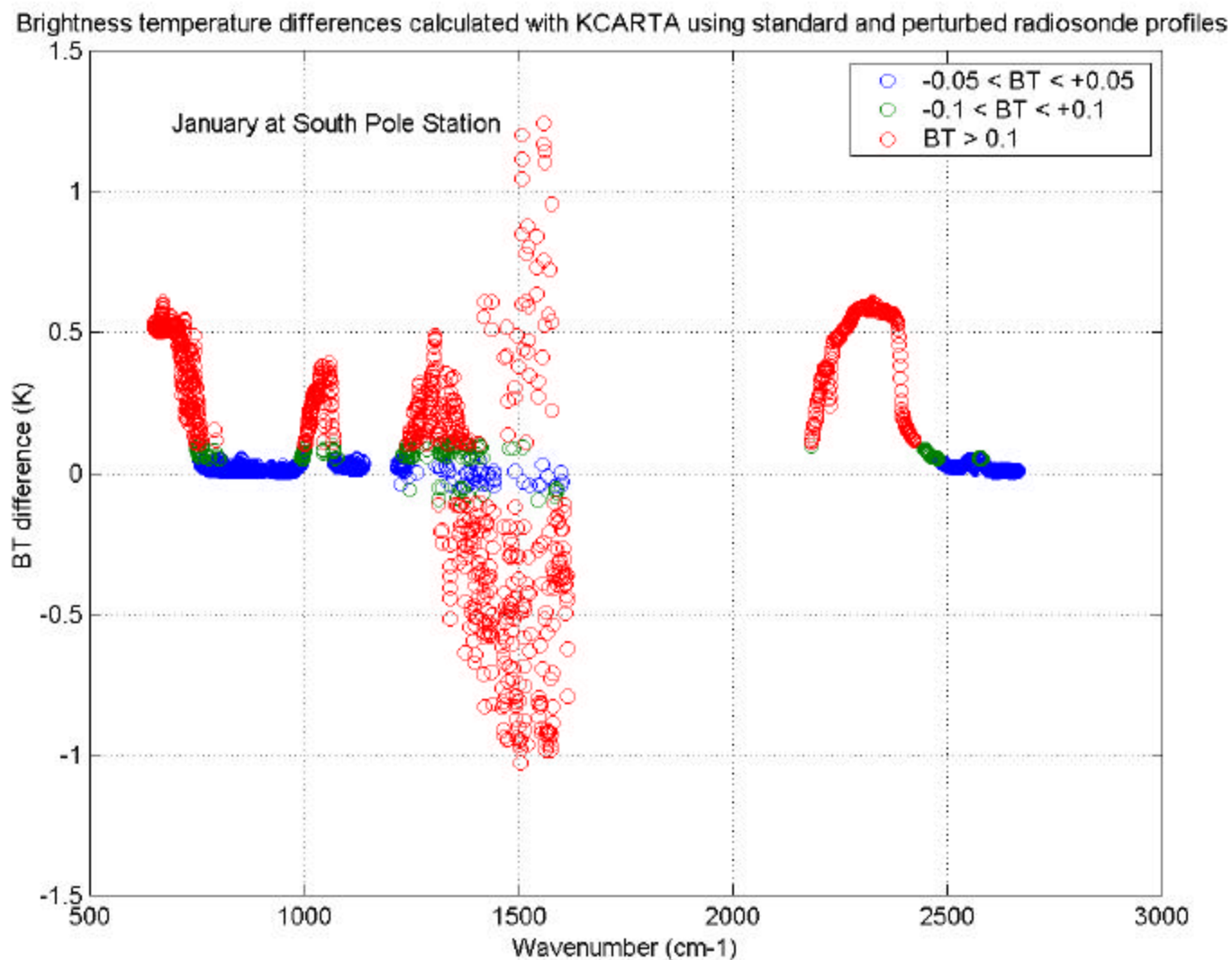
- Used radiosonde data from January at South Pole Station
 - Similar meteorological conditions to Dome C
- Ran *kcarta* with measured radiosonde data, then again with large uncertainties added in both T and H₂O profiles.
 - T : +0.5K (0-30 km), +1K (30-60km) ; RH_{ice}: +10% (0-4km), +25% (4-7km)
[Walden et al. (1998), JGR, 3825-3846]
- Compared brightness temperature spectra for two cases.
- Determined which wavenumbers would be best for validation
 - Category 1: < +/- 0.05 K,
 - Category 2: < +/- 0.1 K,
 - Category 3: > 0.1 K

AIRS TOA Simulation Results



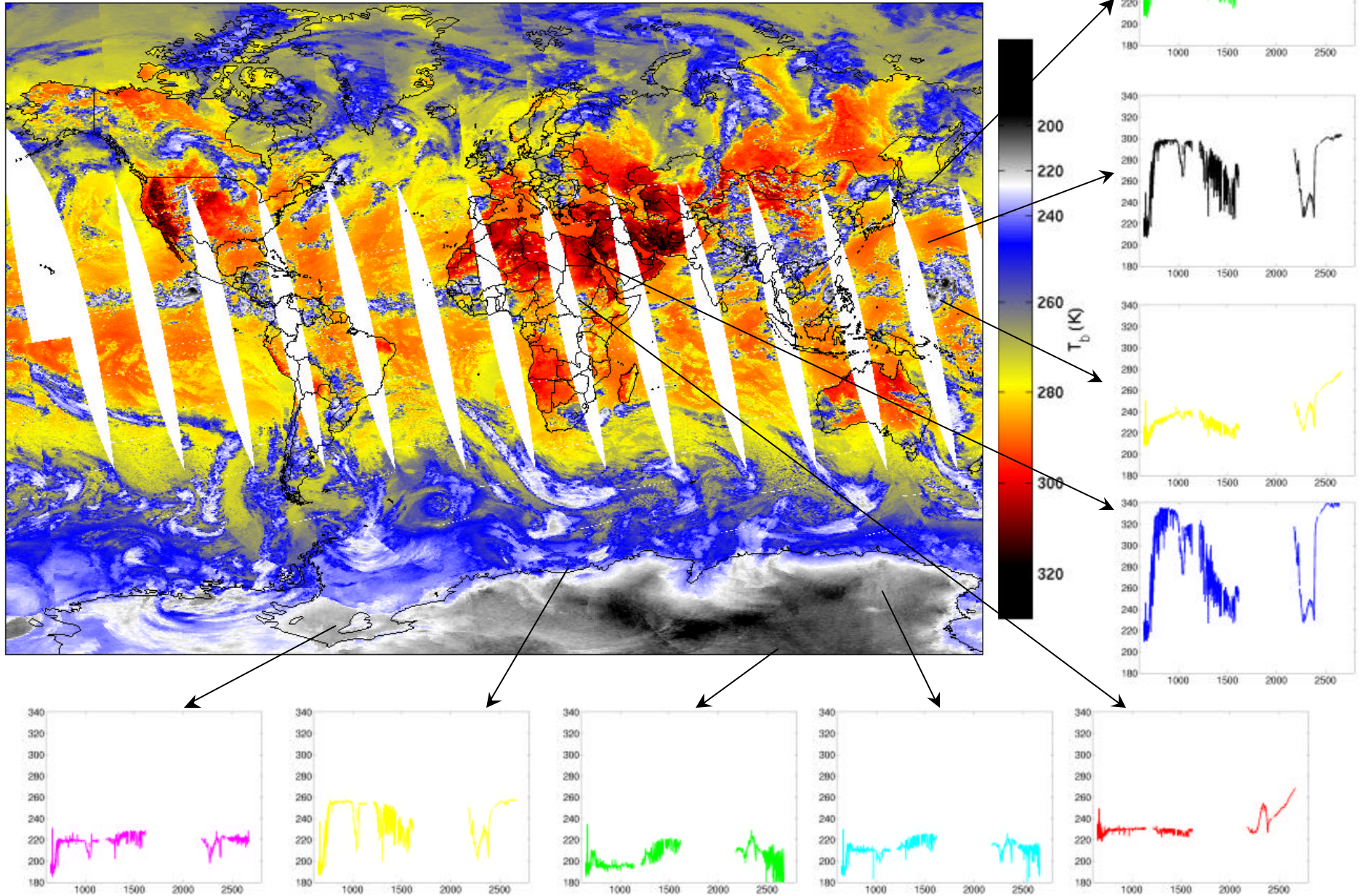
AIRS TOA Simulation Results

- 46% of AIRS frequencies can be validated with errors less than 0.05 K due to radiosondes.
- Frequencies can be validated throughout the $\text{H}_2\text{O } \nu_2$ band.
- Many validation frequencies exist in the 2616 cm^{-1} region



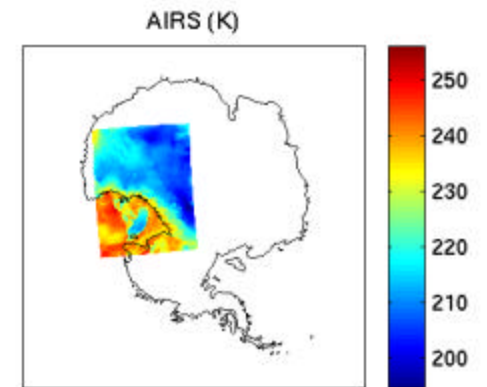
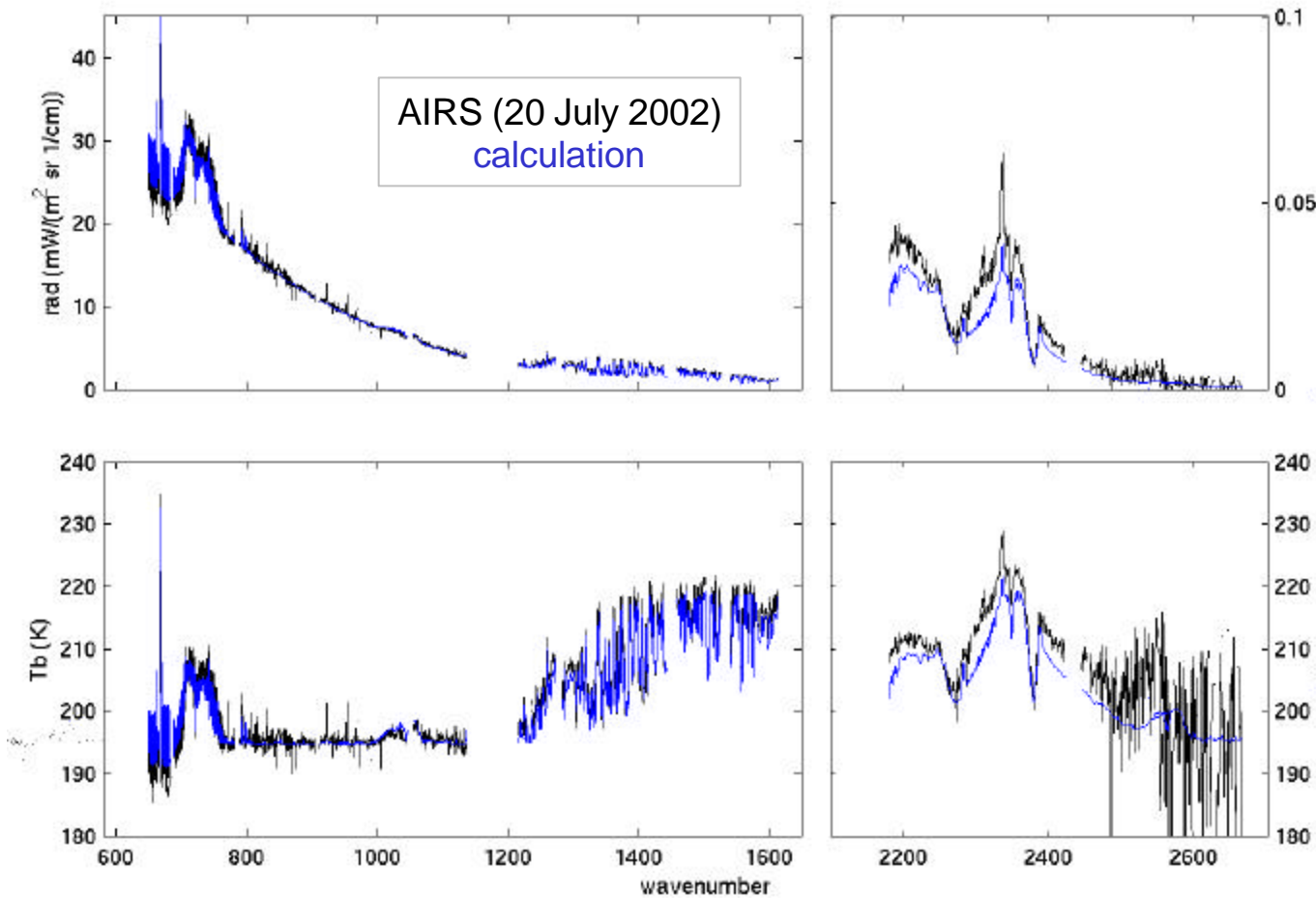
From Hot to Cold ...

20-July-2002 Ascending LW_Window



To Coldest ...

Dome Concordia 20 July 2002 Obs-Calc



Sub-Arctic Winter
May 2001 S. Pole radiosonde
profile used in calculation
(0.365 mm H_2O)

